



Tree Care Guidelines and Best Practices for Manu-o-Kū Breeding Sites

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Cover Photo: Richard Downs

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PURPOSE

Purpose of Guidelines for Tree Care Near Manu-o-Kū Breeding Sites

Manu-o-Kū, the bird species also known as the White Tern or Fairy Tern, is a legally protected bird species. Instead of building nests, breeding manu-o-Kū lay their eggs on the bare branches of trees. A partnership of industry and wildlife experts worked together to develop consensus as to reasonable and effective approaches to getting tree care work done near manu-o-Kū breeding sites. This document provides technical information, detailed best management practices (BMPs), and other related resources primarily for use by tree care professionals, though others such as landscapers may also find it useful. These guidelines are intended for work affecting manu-o-Kū populations on O‘ahu, since the species inhabits urban areas on the island where trees must receive maintenance care. The goals of these guidelines are to:

- Enable urban forestry and arboriculture professionals to make informed recommendations and decisions, and to carry out best management practices, wherever manu-o-Kū breeding sites are present, and to avoid activities that result in an excessive risk of harming manu-o-Kū or their eggs and chicks.
- Empower these professionals to share in stewardship of this ecologically unique and culturally important species.
- Increase public awareness, especially for tree owners who may not be up-to-date on these best practices.
- Develop the partnerships and dialogue between the tree care industry, public agency, and community stakeholders that will reduce uncertainty about working near manu-o-Kū breeding sites while increasing the effectiveness of manu-o-Kū protection.
- Address interlinked Hawai‘i Forest Action Plan Strategies and *Hawai‘i’s Comprehensive Wildlife Conservation Strategy* (2005), led by the Department of Land and Natural Resources, including prioritizing urban tree care by developing and sharing information and tools; delivering education and outreach to the tree industry, tree owners, and to Hawai‘i residents at large; and supporting seabird protection by maintaining and enhancing their habitat.

**The goal of this document:
To enable and empower the
arboriculture community through
education.**

- Develop tree care guidelines that are consistent with current interpretation of the law and guidance provided by the US Fish and Wildlife Service as well as the Hawai'i Department of Land and Natural Resources.

Tree care and landscape companies are continually responding to different types of changes affecting their industry. As manu-o-Kū populations on O'ahu continue to grow and evolve, and as O'ahu communities learn to live with and appreciate this special species, so too the tree care and landscape industries are adapting their work practices to serve the important goal of protecting manu-o-Kū during their sensitive breeding activities.

Purpose and Goals of Manu-o-Kū Protection

A unique relationship exists between manu-o-Kū and urban forestry and arboriculture professionals on O'ahu. Manu-o-Kū benefit from some common arboriculture practices in the urban environment, while, at the same time, they are extremely vulnerable to other practices.

In the early 1960s, manu-o-Kū began to recolonize O'ahu (and only O'ahu) after a long absence from the main Hawaiian Islands. Since then the population has increased many-fold and continues to grow. The reason manu-o-Kū recolonized O'ahu and not other islands is unknown, but much of their population growth on O'ahu is directly attributable to the practices of urban foresters and arborists, because manu-o-Kū prefer urban trees that are well maintained in terms of pruning that keeps the interior tree crowns open and free from dense branches and foliage. However, urban foresters and arborists can represent one of the greatest threats to the manu-o-Kū as individuals and as a population by unwittingly (or unscrupulously) harming or killing eggs, chicks, or adult manu-o-Kū while pruning or felling trees.

Because manu-o-Kū are culturally important, legally protected, and generally beloved by Honolulu's citizenry, it behooves arborists and benefits their profession to conserve them. And because manu-o-Kū are unusually tolerant of noise and activity, arborists are both enabled to conduct their work around them and are empowered to continue to contribute to the well-being of Honolulu's most special bird.



Applicability

These guidelines provide the information necessary for property owners and managers to make decisions about, and carry out work for, the care and management of their trees when manu-o-Kū are breeding in or nearby them.

Arboricultural standards and guidelines that are normally applicable to the tree care activities should be followed, including when working near manu-o-Kū. If there are conflicts between arboricultural standards and these guidelines, the tree care professional working with the trained professional monitoring manu-o-Kū protection should exercise professional judgment in determining the appropriate course of action, documenting any recommendations, decisions and actions taken, and results observed.

Because trees, plants and manu-o-Kū are living organisms, there is inherently a significant degree of uncertainty in tree care work near manu-o-Kū breeding sites. It is possible that certain guidelines and best practices discussed in this document cannot be successfully applied in all situations. Also, as the tree care industry implements these guidelines more broadly, there may be revisions that improve the best practices. Departures from these guidelines should be made only with careful consideration of the reasons for deviating from the best practices contained herein, and with rationale to support such deviations.

These guidelines are not intended to address every situation that may arise. Property owners and managers shall be responsible for all decisions and work done and not done on their trees and landscaping, and the timing of such decisions and work.

INTRODUCTION

The manu-o-Kū, also known as the White Tern or fairy tern and by the scientific name *Gygis alba*, is a widespread seabird that occurs in tropical oceans of the world. Unusual among birds, Manu-o-Kū do not build nests. Instead, they lay and incubate their eggs on a variety of bare surfaces, including tree branches, the ground, and human structures. In Honolulu, the manu-o-Kū primarily use tree branches for laying their eggs and raising their young.

Manu-o-Kū are one of the only native birds that commonly inhabit urban areas on O‘ahu. Manu-o-Kū stand out because of their preference for urbanized areas, their bright white feathers and likeable appearance, making them the subject of greater attention compared to other native species. Tree care professionals and others frequenting the downtown Honolulu area will notice that they are very tolerant of the presence of people, and that their population is increasing. As of 2018, over 1,400 breeding sites in nearly one thousand trees in urban and suburban Honolulu have been documented, and their numbers continue to grow. Interestingly, very few manu-o-Ku are known to breed in the non-urban forests of O‘ahu.

To avoid unnecessary risks to these protected birds, and thereby protect their businesses and the arboriculture industry as a whole, urban forestry and arboriculture professionals must be aware of the ecology of the manu-o-Kū, the laws governing manu-o-Kū protection, and the existing arboricultural best practices near manu-o-Kū breeding sites.

Tree care professionals and tree owners risk significant monetary penalties, and imprisonment, for impacting or harming these protected birds and their eggs or chicks. At the same time, guidelines and BMPs that integrate manu-o-Kū protection into arboricultural operations improve business efficiency while increasing the ecosystem benefits of those operations.

Biology and Breeding Habits

Distribution

The manu-o-Kū is a migratory seabird found globally in tropical regions. They forage for food at sea, sometimes many miles from land, and breed on islands. Worldwide, populations are believed to be greater than 100,000 breeding pairs. In Hawai'i, they are common on several of the Northwestern Hawaiian Islands, but in the main islands they currently occur only on O'ahu. In 2005, populations were estimated at 7,500 breeding pairs on Midway, 5,000 pairs on Nihoa, and 1,000 pairs on Laysan.

Manu-o-Kū are believed to have been extirpated from the main Hawaiian Islands sometime after humans immigrated. O'ahu's first breeding pair in recent history was observed in 1961. By 2005, about 250 breeding pairs were recorded. By 2018, the population on O'ahu had increased to over 2,300 birds, including about 700 breeding pairs. In 2018, over 1,400 breeding sites in nearly 1,000 trees were documented, though not all were in use simultaneously. Many manu-o-Kū leave O'ahu when they're not breeding, as evidenced by

the seasonal decline and rise in the number of birds coinciding with changes in breeding activity during the year. However, there is some breeding activity by manu-o-Kū on O'ahu during all months of the year.



Currently, the manu-o-Kū breeding range is restricted to

Honolulu, from Hawai'i Kai in the east to Hickam Air Force Base in the west, but their range continues to expand.

Manu-o-Kū breed in trees on both public and private property, though the vast majority of documented breeding locations are in public trees. Nevertheless, all types of property owners and managers, and the tree care professionals who care for their trees, may have manu-o-Kū on their properties.

Biology, Breeding and Rearing Young

The typical lifespan of a manu-o-Kū is 16-18 years; individuals living up to 42 years have been recorded. Pairs remain together for several seasons. Individual manu-o-Kū typically remain near their breeding colonies while breeding, and seldom venture far from shore. Little is known about where manu-o-Kū venture when they are not breeding, but they can be found throughout the tropical oceans of the world sometimes hundreds of miles from land.

Manu-o-Kū do not make a nest, instead they lay their single egg directly on a bare surface, such as a tree branch, on a building, or rarely on the ground on some islands. The term “breeding site” is used in this document to indicate the location where a pair of terns lays an egg and raises a chick.

Breeding pairs often use the same breeding site year after year. Throughout Honolulu, manu-o-Kū lay their eggs in trees on small or medium branches, and it is common to see multiple pairs in one tree. Elsewhere around the world, manu-o-Kū routinely lay their eggs on rocky ledges, human structures, and occasionally on the ground.

Because manu-o-Kū sometimes lay their eggs on unsecure locations, the eggs can be vulnerable to falling. This species has a higher than normal rate of egg loss and chick mortality during strong wind events compared to other similar bird species. However, not building a nest may explain why manu-o-Kū are free from many parasites that plague other birds, and they do not have to spend time and energy building a nest.

In Hawai'i, breeding is year-round but most eggs are laid between late January and June with a peak in laying between March and April. Some pairs will raise two chicks per year, and a few may even raise three chicks per year. Eggs are 1.6 inches long (41 mm) on average, and can be very difficult to see, especially in tall canopies.

When a bird sits on an egg it is referred to as “incubating.” When a bird sits on a small chick it is called “brooding.” An incubating or brooding manu-o-Kū will be positioned low with its body against the branch, and usually its legs will not be visible (i.e. it is not standing on its legs but is resting on its belly) with the feathers below its chest fanned out over the egg, and it will hardly move except to occasionally turn its egg. A bulge



may be visible in the feathers on the bird's chest, which indicates the presence of an egg or small chick (see photo previous page).

Both parents help to incubate the egg and brood and feed the chick. On O'ahu, eggs hatch about 35-36 days after being laid, and chicks fledge about 45 days after hatching. Chicks, like eggs, can be very hard to find due to their size and mottled coloring.



Small chicks are covered in down and have a shorter beak (far left). Feathers start to become visible when the chick is about two weeks old (left). Fledglings are about the same size as adults, but have light brown marks on the wings and

back (photo below), and their beaks are shorter and lacks the blue color at the base present in adults.



The brown bars on this manu-o-Kū's wings help identify it as a fledgling.

Manu-o-Kū parents will leave the breeding site to forage at sea, leaving their chick alone for several hours or even the entire day. These unattended chicks have not been abandoned and should not be disturbed or removed; in most cases the parents will return within a few hours to feed them.

The age when chicks start flying can vary by more than a week. Older chicks may walk around on the branch where they hatched before they can fly, and may not

always be in the exact same spot. Fledglings remain dependent on their parents, who continue to feed and care for their young for up to 8-11 weeks or longer.

Once it is able to fly, a fledged chick will continue to return to the breeding site where it was raised. Its parents also continue to return to the same branch to feed the fledged chicks for two months or more.

Socio-cultural Framework

The manu-o-Kū or, in English, "bird of Kū" or "Kū's bird," has a special status in Hawaiian and other Polynesian cultures. It is the only bird that appears to be named after a Hawaiian deity, and its name also carries additional multi-layered meanings. Manu-o-Kū also are part of the legends of the islands, appearing in popular stories told by Hawaiian cultural practitioners. See the appendix to learn what was discovered in writing these guidelines.

Today, manu-o-Kū remain important to the cultural traditions of Polynesian and Micronesian ocean navigation or wayfinding. Manu-o-Kū are one of the key aids that enable successful wayfinding in the ancient practice of Polynesian and Micronesian voyaging, especially in the final stages of locating land. As each day begins, manu-o-Kū leave land and fly out to sea to forage, and as the sun sets at the end of the day, they head inland to roost. Manu-o-Kū also are the only seabird that carry prey in their beaks as they return to feed their chicks. Knowing these facts, voyagers who study manu-o-Kū are able to gain clues as to the location of islands they may be approaching.

The manu-o-Kū was designated as the official City and County bird of Honolulu in 2007, and Honolulu supports the largest urban population of manu-o-Kū in the world. Honolulu visitors and locals enjoy watching the charismatic birds, and tours for viewing and photographing them are becoming increasingly popular. Breeding manu-o-Kū periodically make the evening news, and efforts to protect them are popular with the public. O‘ahu’s manu-o-Kū population has attracted the attention of major media companies, which have filmed programs about the unique habits of this species. Growing numbers of children study them as part of their natural science units at school.

We are privileged that manu-o-Kū chose to make urban O‘ahu their home. They are embraced and beloved by the people of Honolulu, and sharing the urban geography of Honolulu with the manu-o-Kū contributes to our sense of place identity.

Legal Framework

International Treaty as well as State and federal laws aim to protect and conserve Manu-o-Kū.

Migratory Bird Treaty Act

(16 U.S.C. 703 *et seq.*)— A bi-lateral treaty between the United States and Japan was completed in 1972, naming the manu-o-Kū, among other birds, as a species that the two nations agreed to conserve. In the United States this treaty is implemented by a law known as the Migratory Bird Treaty Act (MBTA). The MBTA states that, without a permit:

...it shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase, deliver for shipment, ship, export, import, cause to be shipped, exported, or imported, deliver for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export, any migratory bird, any part, nest, or egg of any such bird, or any product, whether or not manufactured, which consists, or is composed in whole or part, of any such bird or any part, nest, or egg thereof...

Thus, the law prohibits even the mere possession of white terns whether dead or alive as well as their feathers, eggs, or any parts thereof.

Under the MBTA, penalties can range from \$150 up to \$15,000 and may include imprisonment. The law further provides that penalties for illegal commerce in white terns or their parts is punishable by a fine up to \$250,000 for individuals or \$500,000 for corporations and imprisonment for up to two years.

Hawai'i Administrative Rules (HAR)

Hawai'i law considers the manu-o-Kū as both "indigenous" and as "threatened (on O'ahu)". In cases without a permit, Section 13-124-3 prohibits:

- (a) With respect to indigenous, endangered, and threatened species...no person shall or attempt to:
 - (1) Take, possess, process, sell, offer for sale, or transport any such species, any young or egg, or the dead body or skin thereof within the State;
 - (2) Export any such species, or any young or egg, or the dead body or skin thereof from the State.
- (b) No person shall remove, damage, or disturb the nest of any indigenous, endangered, or threatened species. Disturbance to a nest is any action that alters a nest. For example, hitting the nesting branch and causing the adult to leave its egg unattended is considered a disturbance and is prohibited.

Under Hawai'i Revised Statute, the penalty for a first violation is a fine of not less than \$250, imprisonment for not more than a year or both. In addition, the Department of Land and Natural Resources (DLNR) may impose an administrative fine of up to \$5,000 per specimen harmed.

Manu-o-Kū and Tree Care Work

Manu-o-Kū show a definite preference for trees that are pruned regularly versus trees that are unmaintained. Maintenance pruning typically results in more open tree crowns, thereby improving access to the inner canopy where the manu-o-Kū prefer to breed. Maintained trees also have more "cups" – upward facing, circular woundwood surrounding old pruning cuts – that manu-o-Kū favor for breeding sites.

On O'ahu, manu-o-Kū have been observed breeding and roosting in at least 58 different tree species. The tree species used most frequently by manu-o-Kū are, in descending order, with percent of each species: monkeypod (*Samanea saman*, 33%); shower trees (*Cassia* sp., 12%), kukui (*Aleurites moluccana*, 11%), Chinese banyan (*Ficus microcarpa*, 7%), West Indian mahogany (*Swietenia mahagoni*, 6%), and Indian banyan (*Ficus benghalensis*, 3%). Most trees used by manu-o-Kū in Honolulu are large (45 cm in diameter or larger), but terns have used trees that range widely in size (15–295 cm in diameter). Tree species preference appears to primarily be a function of availability, because most of these tree species are among the most commonly planted in Honolulu. The only tree species that appear to be preferred (i.e., used more often than expected given their availability) are kukui and the West Indian mahogany; these two species are uncommon in Honolulu, but often are used by manu-o-Kū.

BEFORE WORK BEGINS – PLANNING FOR MANU-O-KŪ

Getting the Trained Professional On Board

All work potentially affecting trees with manu-o-Kū breeding sites shall be overseen by a qualified wildlife biologist, qualified arborist, or other professional, who has been trained in manu-o-Kū protection guidelines and best management practices. A trained professional overseeing work near manu-o-Kū breeding sites shall be able to competently apply their understanding of the guidelines presented herein when overseeing or carrying out tree care activities near manu-o-Kū breeding sites.

The qualified biologist, qualified arborist or other trained professional surveys for manu-o-Kū in the work area, and oversees all tree care work to be done that may affect manu-o-Kū breeding activity if manu-o-Kū are present. The trained professional should be present at all times during such tree care work.

Aloha Arborist Association maintains a listing of individuals who have attended a training conducted by DOFAW or US FWS. This training may be voluntary, or it may be mandatory if the work is being done for a public agency that specifies it as a requirement for their contracts. In all cases, the training is strongly recommended. The list of trained professionals can be found at www.alohaarborist.com.

Is the Job Near or Within Manu-o-Kū the Breeding Areas?

It is important that the trained professional verify in advance if the job site is within or near the known geographical area used by manu-o-Kū on O‘ahu. If so, then the job has a higher than normal chance of encountering breeding manu-o-Kū. Manu-o-Kū often breed in the same tree year after year, but their small eggs and chicks are easily overlooked, especially in a large tree. Determining in advance whether a tree was previously used for breeding can save time and prevent mistakes.

Fortunately for the arboriculture community, an organization called the Hui Manu-o-Kū has since 2016 been surveying manu-o-Kū breeding sites. The trained professional should go online or use their mobile device as described in the next section to check if the trees that are part of the job have been identified as trees with breeding activity. Especially on public property within the known breeding range, most of these trees are already documented, thus greatly expediting this step for tree businesses.

Check Tern Breeding Maps Online and On Your Mobile Device

The most up-to-date maps showing the locations and range of manu-o-Kū breeding can be found on the Hui Manu-o-Kū website at <https://www.whiteterns.org/nestmap.html>.

At this website, the trained professional will find accurate information on both active breeding, and historical breeding locations. The breeding maps are interactive tools that can be used in the office as well as in the field to locate trees where manu-o-Kū have previously or are currently breeding. The webpage includes instructions on the use of the maps.

Instructions are also included in the appendix describing how to use Google Earth on your mobile phone or tablet. You'll be able to check, while on site or anywhere else, if trees that are part of a job already are documented breeding sites.

The online and mobile tools help make it easier to determine if manu-o-Kū are in trees where work is to be done. However, there are limitations. New trees are continually being used for breeding as the tern population grows and expands. Also, as the O'ahu population of manu-o-Kū continues to grow, breeding sites will be found outside the known breeding range. Lastly, far fewer trees on private property have been evaluated for breeding activity. Therefore, once on the job site, the trained professional must also survey any trees that are not already found on the website or via the mobile tool.

Tern Tape – What It Is and What It Means

Light blue plastic flagging referred to as “Tern Tape” has become a common sight on the trunks of trees in the Honolulu and Waikiki areas. Tern Tape, attached by Hui Manu-o-Kū in coordination with public agencies, is intended to help tree services and the community at large to locate breeding manu-o-Kū, their eggs or chicks. Seeing Tern Tape on tree's trunk quickly notifies a tree crew to assess the tree for breeding activity and to proceed with caution.



Tern Tape wrapped around each tree has several pieces of useful information. The Tern Tape is printed with a QR Code that can be scanned by a smart phone. The QR Code will allow you to access online links and open photos of branches where the egg(s) or chick(s) are positioned, as well as information on when the tree was last surveyed and the status of known breeding sites (vacant, egg or chick).

The tree's unique ID # also is hand-written on the Tern Tape. The tree's ID # identifies the tree's location on the breeding map (see previous section); data for all observed breeding activity for that tree is organized under this unique ID #. The trained professional should look up this code on the breeding map, and open links to the photos showing the branches where eggs or chicks are likely to be found in the tree.

Important notes about Tern Tape:

1. If you see it on a tree, then there is an egg or chick in the tree (i.e. is actively being used by breeding manu-o-Kū). Every tree that has Tern Tape on it is being actively monitored on a monthly basis, and the flagging is removed from the tree when the egg or chick has either died or fledged (i.e. is capable of sustained flight).
2. If you DON'T see Tern Tape on a tree, it does NOT mean that there is/are not egg(s) or chick(s) in the tree. You still need to be on the lookout for incubating adults, chicks and eggs.
3. At times, passers-by will completely remove the Tern Tape, or it may be found on the ground nearby. It has also been observed that, on occasion, Tern Tape has been removed and placed on a different tree by unauthorized individuals. Check that the photos and data are a match with the tree to which the Tern Tape is tied – for example, that it's the correct tree species, correct location, and so forth.
4. There will be cases when a breeding site has become vacant since the Tern Tape was placed on the tree due to the egg or chick having fallen from the tree, taken by a predator, or because the chick fledged. (You can still find the tree and breeding information on the breeding map using the online or mobile tools even if the tree has no Tern Tape.)

Surveying for Chicks, Eggs, and Other Evidence of Breeding

The next, very important, step to working near manu-o-Kū breeding sites is to examine the tree for breeding activity that may not have been documented in advance. The trees targeted for trimming should always be visually surveyed from the ground before any work is done.

The amount of time needed to adequately survey a tree for manu-o-Kū activity depends on the surveyor's skill level, the size of the tree, the size of the chick, and other factors. Surveying success improves with practice. It may take five minutes or less for a small tree, or twenty minutes or more for a large tree. Unattended eggs and small chicks can be difficult to sight, especially in large trees with complex canopies such as banyans, or tall canopies such as West Indian mahogany trees. Using a good pair of binoculars is helpful help. The trained professional should spend sufficient time to satisfactorily determine whether any breeding activity is present.



The surveyor should look for:

- White feathers or "whitewash" on the ground - clusters of bright white droppings that contain no seeds or insect remnants. Whitewash can be particularly obvious on paved areas beneath the tree or on branches, but at times there are only one or two droppings observed. Whitewash is difficult to detect on soil or landscaped areas.
- Adults flying around with food (fish or squid) in their beaks. This is a sure sign that a chick is in the area.



- Manu-o-Kū flying around or perched in the tree. Breeding adults may swoop at or hover over anything they view as a threat, inadvertently revealing their breeding activity.
- Adults in incubating position - see the photo at left.
- Chicks or eggs on branches along the inner canopy, as well as following branches out to the outer canopy. Manu-o-Kū can breed on branches as small as one-inch diameter, since crossing branches and forks are used for breeding. Look for moving chicks, which can make them easier to detect.

Documenting Manu-o-Kū Activity

If breeding activity is observed, the trained professional should document observations. Information to be documented should include the date and time, tree number (if flagged with blue tern tape), the address and location of the breeding site relative to a landmark or cardinal direction, height above ground, branch diameter, and distance from the center of the canopy. It also should provide a description of the manu-o-Kū presence, that is, whether it's an incubating adult, egg, or chick and an estimate of the chick size. Use the White Tern Growth Chart (see the appendix), or a more general description such as "small" for chicks with only fuzzy down and no feathers, "medium" for partially feathered chicks, and "large" for chicks that are fully feathered and about the same size as adult manu-o-Kū.

If possible, the trained professional should provide the information to Hui Manu-o-Kū on the organization's website or via their mobile tool, since this helps manu-o-Kū researchers to track the species' breeding activities (see the instructions in the Appendix for reporting using your mobile device). Also, inform the property owner/manager about the presence of protected manu-o-Kū and how your work helps them remain compliant with the law and protect a special natural resource.

WORKING NEAR AN ACTIVE BREEDING SITE

Based on observations of Manu-o-Kū behavior, experts have determined that this bird species is highly tolerant of human presence and activity compared to other native bird species. As a result, in contrast to best practices near other protected wildlife species, tree care professionals are able to conduct tree care closer to manu-o-Kū breeding sites – as long as the guidelines and best practices described in this document and especially in this section are well-understood and used.

Monitoring Manu-o-Kū During Tree Work

A wildlife biologist, arborist, or certified tree worker who has been trained for manu-o-Kū protection shall be designated as the trained professional to monitor and provide recommendations for protecting the incubating adults, chicks or eggs that are present. The trained professional should monitor and ensure that the tree worker, once s/he is aloft in the canopy, inspects the tree for any breeding activity that might have been missed during job planning and ground surveying. It is common to observe additional breeding activity for the first time at this stage of operations, due to the improved sight lines. The tree worker shall carefully and thoroughly examine all branches in areas of the tree where work is to be performed, as well as check branches lower down that are within the drop zone. The tree worker then notifies the trained professional whether or not additional breeding sites are observed.

When a breeding site is present, the trained professional should observe the affected terns during the entire period when work is taking place, alert the work crew immediately about any concerns or conditions that require a response, make recommendations to be carried out to protect the tern(s), and be able to seek assistance from wildlife experts if it should become necessary to do so.

Manu-o-Kū are remarkably tolerant of noise and activity near them. After all, they've chosen urban Honolulu as a place to breed.

Behavior-Defined Buffer Zone

The buffer zone around a manu-o-Kū breeding site is a three dimensional boundary designed to protect breeding adults and chicks from disturbance. Disturbance results in stress responses, such as when an incubating adult steps off its egg, or a chick moves away or attempts to fly away from the direction of the disturbance, and is prohibited by State of Hawai'i law. The buffer zone extends horizontally in all directions from any breeding activity, as well as above and below the protected chick, incubating adult or egg. It's important to be aware that manu-o-Kū are more sensitive to activities that occur above them than below them.

The buffer zone for manu-o-Kū is defined by the behavior of the individual bird. This behavior-defined buffer zone may be ten feet or more, or it could be as little as three to four feet, depending on the careful control of the worker's own behavior and the individual bird's response. Therefore, the buffer zone is fluid, is highly influenced by the tree worker's actions, and may change as tree work progresses.

When an individual bird begins to display stress responses, the behavior-defined buffer zone has been breached. The tree worker shall then immediately cease activities and slowly and deliberately move away. All equipment and personnel should be kept outside the behavior-defined buffer zone at all times.

Approaching and Working Near Chicks or Incubating Adults

When starting tree care activities, the trained professional should note the behavior of all adult manu-o-Kū in the area, and conduct a careful search for a well-concealed egg or chick (see previous section on how to do this). Non-breeding Manu-o-Kū may be gently shooed out of or away from a branch or tree that needs to be trimmed or removed, but continue to be vigilant for any eggs or chicks that can easily be missed. Work within ten feet of a Manu-o-Kū adult on an egg should be avoided when possible. When working within twenty feet of an incubating Manu-o-Kū, the trained professional should constantly monitor the incubating Manu-o-Kū and direct the actions of the tree worker.

Use of Non-Threatening Behavior and Other Best Practices

The tree worker, coached by the trained professional as needed, shall minimize behavior that may either be perceived as threatening or that may actually threaten any birds. When working in a tree with breeding activity, approach manu-o-Kū slowly and with controlled movements:

- Turn your body or face away from the bird, and avoid staring, which can be perceived by the birds as threatening behavior.
- Avoid sudden, rapid movements, including rapid movements toward the birds; any movements that shake or jolt branches; and loud noises, especially when within about ten feet or less from the bird.
- Manu-o-Kū are especially sensitive to anyone approaching from above. If you are above the bird, try to remain more than ten feet away.
- Avoid disturbing an incubating tern such that it steps off its egg. If an incubating adult steps off its egg, immediately move away, while avoiding abrupt movements, and monitor the situation until the bird returns to and settles down on the egg.
- An incubating adult or chick will need a few minutes to adjust to the presence of a human. Do not try to rush this adjustment period.
- Maintain a high level of awareness of the individuals while continuing to work near their breeding site. A tern that appears to be nervous to start with may acclimate to your presence after a few minutes.

As previously described, utilizing non-threatening behavior, the tree worker may be able to approach individual birds more closely. For many activities of brief duration near most manu-o-Kū, the buffer zone may be as little as three feet. Therefore, if done with care, most if not all tree pruning can be performed in a tree when unattended chicks or incubating adults are present.

When pruning, tree workers also shall avoid:

- Pruning that vibrates, shakes or causes any other type of movement to the branch with the breeding site.

- Pruning debris or other objects shall not be dropped from above in such a way as to enter the buffer zone or fall within a hazardous distance from the breeding site, especially taking into account drift and wind that can carry debris onto a breeding site.
- Pruning debris and other objects shall not strike or cause movement of any manu-o-Kū or the branch where the breeding site is located.
- Striking or colliding with, or vibrating the part of the canopy, or the branch, in which active breeding is found. Beware the location of the arm of an aerial lift or any other equipment that may unintentionally strike or collide with the branch or part of the canopy where the birds may be located.

When working near chicks or adults incubating an egg, all tree work shall be done in such manner as to prevent all vibration, movement, or striking of the branch on which the breeding site is located, or any branches near or protecting the breeding

Chicks and eggs should never be picked up or moved from their breeding sites. Picking up or moving any manu-o-Kū from their breeding site constitutes possession, and is a violation of both federal and state protections.

Use of Electric and Manual Equipment

Noise levels of chainsaws and chippers (if temporary) do not appear to disturb manu-o-Kū in a noticeable manner but should always be minimized. Nevertheless, it is recommended that electric saws be used (if available) when working within twenty feet and manual pruning tools be used within ten feet of a breeding site. Especially if the trained professional or tree worker observes that breeding adults or chicks are responding poorly to chainsaw or other loud equipment, it may be worth trying manual pruning tools.

Continuous Monitoring of Breeding Site

Anytime there are breeding adults or chicks the vicinity, the trained professional and tree worker shall continually maintain awareness and monitor the bird(s) for behavior that could indicate they are being disturbed, and move tree care activity away from the affected bird(s).

Special Care Working Near Incubating Adults, Unattended Eggs and Fledged Chicks

It's important to repeat and emphasize that a startled or fleeing adult is at a significant risk of unintentionally knocking its egg off the tree branch. If an adult begins to or completely leaves its egg on approach by the tree worker or during tree care activities, no further activity should occur until it returns and settles back onto its egg.

If an unattended egg appears to be especially prone to falling, the tree crew should avoid the breeding site until it is hatched. If the unattended egg is secure, then the tree worker may

choose to carefully complete their pruning work and leave the area. Eggs may not be handled in any way during tree trimming activities.

When working near older chicks, use the Chick Growth Chart in the appendix to estimate the age of the chick. If the age of the chick is even a little uncertain, the tree worker should approach the chick with the level of caution as if the chick were flightless. Large chicks that are close to fledging may attempt to leave if stressed. If a chick takes flight and departs while work is ongoing, the trained professional should watch its flight and determine that the chick has successfully flown to a protected location. A chick that is not truly strong enough to fly may end up on the ground or at a low point and be unable to return to a safe place or to its breeding site.

Tree care operations may be completed in the fledged chick's absence. Because a fledged chick and its parents will continue to return to the breeding site for two months or more after the chick is flighted, it is recommended that the branch where the breeding site is located be retained until the fledged chick and its parents no longer returning to that location.

Arboriculture Practices That Promote Manu-o-Kū Breeding

Maintaining Manu-o-Kū-Friendly Crown Density

Excessive crown density can impede manu-o-Kū access into the inner crown where they like to breed. At the same time, excessive pruning or topping can leave breeding sites over-exposed to sunlight, potentially threatening an existing egg or chick.

Trees with breeding manu-o-Kū should be pruned to maintain a crown density that promotes access while providing protection for breeding activities. Normal tree pruning goals typically provide good access, and it is not necessary to prune differently for manu-o-Kū that use the tree. If branches over a breeding site are being pruned, the tree worker should leave enough branches and foliage so as to maintain no less than 70% shade over the breeding site for at least ten hours per day. If crown density over the egg or chick location at mid-day is less than 70% prior to pruning, then avoid increasing sun exposure.

Branch Structures Favoring Manu-o-Kū Breeding

Manu-o-Kū seek out the branch features that aid in stabilizing their eggs – cups, forks, triangular formations from crossed branches (known to manu-o-Kū experts as closed loops), and branch grooves. When possible, save branches that have depressions, ideally formed branch unions or crossing patterns that are used for breeding sites, or that have been used for breeding.

If there is decay or poor compartmentalization that increases the risk for branch or tree failure, regularly inspect the branch in question to determine whether it can be kept. If a branch used for breeding cannot be preserved due to a risk of failure that cannot be mitigated, it should be removed when there is no breeding activity present. (If a chick is

present, then check its size against the breeding chart in the appendix to estimate when it will be possible to return.)

Sound branches that are used for breeding should be preserved, including when there's no active breeding. Not only do manu-o-Kū pairs return to the same branch location year after year, but researchers studying manu-o-Kū also depend on the ability to collect data on returning birds in order to build a continuous body of useful scientific data. Lastly, breeding terns will relocate if their breeding site is removed; the more they move around, the more chances a tree trimmer will unintentionally disturb a new, undocumented breeding site.

Attachments to manu-o-Kū breeding sites have been used in the past to stabilize eggs. Attachments used in the past have been as simple as a piece of wood screwed into place to increase the stability of a breeding site. However, any attachments should be installed only in consultation with a qualified arborist. These attachments should be inspected and adjusted regularly to avoid damage to the branch itself.

Lighting and Other Hardware Installation

Lights are often installed on the trunk or lower parts of trees to enhance landscaping. Night lighting has not been found to negatively affect manu-o-Kū or their breeding activities. Workers installing temporary or permanent lighting, support systems, lighting protection systems, or other hardware in trees should follow the same guidelines and best practices as described above for general tree care.

Selecting Tree Species to Support Manu-o-Kū Populations

Manu-o-Kū do not breed in palm trees. When selecting tree species for new or replacement plantings, avoid palms and choose tree species that have spreading branches. Also, as the potential for widespread disease or pest problems with any one tree species can affect the manu-o-Kū who breed in them, aiming for species diversity also is a long-term goal.

TREE EMERGENCIES

A qualified arborist may determine that in her/his opinion a tree part or tree with breeding manu-o-Kū is an immediate hazard. Examples of emergency conditions include tree parts that are in contact with high voltage conductors, or tree parts that are in the process of failing.

A tree part that is in the process of failing, or anticipated to fail before the breeding cycle can be completed, constitutes a true emergency. A tree emergency meets all the following criteria:

- It poses a material threat to targets such as persons, property, or critical functions such as major roads or utilities,
- There exist no reasonable measures that sufficiently reduce the likelihood of failure and/or the likelihood of harming an important target. All mitigation measures should be considered, such as blocking access and exclusion of users, removing potential targets, and/or removal or reduction of parts of the tree that do not affect the breeding site.

If access is blocked to prevent users from approaching a failing tree or branch, then the area also will be effectively blocked for protection of any terns until further steps can be taken, thereby partially mitigating the emergency and providing more time to save the chick or incubating adults.

A qualified arborist or other qualified tree professional shall assess the nature of the emergency. The trained professional responsible for manu-o-Kū protection, if it is someone other than the arborist performing the tree risk assessment, also shall recommend action(s) to rescue chicks or eggs from any limb or tree threatening persons or property.

Generally, a branch or tree containing an egg or flightless chick may not be removed without a permit. In emergency situations the trained professional shall demonstrate good faith effort to avoid harming manu-o-Kū breeding sites, chicks or eggs, and to obtain permission from USFWS Office of Law Enforcement, or DLNR/DOCARE, in advance of any proposed branch or tree removal activities that could result in loss of a branch or tree that contains an egg or flightless chick.

In a true emergency, if neither the the USFWS Office of Law Enforcement or DOCARE can be reached, and human safety or other major target is imminently jeopardized by a branch or tree, then the trained professional should take the actions necessary to preserve human life and property.

Once work is completed, the USFWS and DLNR DOCARE should be immediately notified of the incident. The trained professional designated to oversee manu-o-Kū protection should be



In this instance, what was originally believed to be an emergency removal was resolved by major reduction of the canopy. The chick (circled) was left to finish growing. After it fledged, the remainder of the tree was removed.

prepared to fully describe the circumstances that constituted the emergency and justify the actions taken.

The following information shall be documented in detail to demonstrate that harm to the breeding site could not be avoided:

1. Address, species, and location of tree on the property
2. Estimated tree height and trunk diameter
3. Breeding location and description of manu-o-Kū breeding activity (see Documenting Manu-o-Kū Activity, page 12)
4. Detailed description of conditions constituting imminent threat to safety or property:
 - Nature of tree defect (including location and sizes of parts likely to fail) and the likelihood of failure
 - Description of users, property or essential function threatened, including location relative to the tree hazard
 - Anticipated timeframe for risk of failure
5. Description of all mitigation measures considered, including blocking access, moving targets, installing a support system, and partial removal of tree part or tree, explaining why they could not be undertaken.
6. Photo documentation of the tree, conditions constituting an emergency, nest site(s), and chicks or eggs

Loss of a manu-o-Kū egg or chick may only be considered in a true emergency, and not for “emergencies of convenience.”

If it cannot be demonstrated that destruction of an active breeding was necessary, the trained professional, tree contractor, property owner, and/or other involved parties may be held responsible for violation of statutes protecting manu-o-Kū.

TROUBLESHOOTING

On occasions when unexpected events occur, the trained professional should evaluate the situation and determine next steps.

Unattended Eggs

During the incubation period, manu-o-Kū parents will take turns incubating their egg continuously, and rarely leave it unattended for more than a few minutes at a time. If the trained professional observes an unattended egg, the first course of action is to check the

online nesting database to determine approximately how long ago it was laid. MOK eggs on O'ahu typically hatch after 35 days. If the egg was laid more than 35 days prior and the trained professional believes there may be a problem, then s/he should call the Hui Manu O Kū's hotline number: (808) 379-7555.

Recently Fledged Chicks

Fledged chicks are able to fly and are generally much less vulnerable. They do not need any special care unless injured or sick. If a chick that can fly (even a little) is on the ground or on a low perch and appears to be uninjured, gently coax it to a higher perch and then leave it alone. Chicks near or on the ground are extremely vulnerable to predators, especially cats and dogs, and will be safer on a high perch. They should not be left near or on the ground, since they are unaware of the threats they are likely to face.

Abnormal or Unexpected Events

For the types of unexpected or abnormal events described below, contact The Hui Manu-o-Ku hotline, US FWS, or DLNR at the earliest possible chance.

Injury or Death of a Manu-o-Kū Adult, Chick, or Egg

Call one of the phone numbers on page 23 and be prepared to provide detailed information about the injured or fallen bird. If directed to and the trained professional is able to do so, s/he should continue to protect the bird in place until one of the manu-o-Kū specialists can get there.

Broken eggs are unlikely to survive, however affected adults or chicks shall be protected from further harm. If there is a risk of further harm and the affected bird can be moved, the trained professional or other samaritan should carefully move it to safety. Picking up a chick or injured adult in order to prevent further harm is not a prohibited activity, and tree workers are encouraged to do so if such action may save the life of the individual. Parents of a chick also will not reject a chick simply because it has been handled by a human.

Protracted incubation period

Manu-o-Kū have been documented tending an egg for as long as six months before finally giving up. If a breeding pair is tending an egg for what appears to be an abnormally long period, the trained professional shall contact the Hui or one of the wildlife agencies for assistance; no decisions or actions should be taken independently with regards to these cases.

Fallen or Unattended Chick

If an unfledged chick is seen alone for extended periods, or falls or is found on the ground, call the Hui Manu O Kū's hotline at (808) 379-7555, one of the wildlife agencies, or the Hawai'i Wildlife Center. If any of those experts are reached and the chick is not injured, they

will assist in deciding if “renesting” is an option. They may either meet you or instruct you by phone on how to return a chick to its original breeding site.

IT IS IMPORTANT FOR INEXPERIENCED TREE PROFESSIONALS CONFRONTED WITH A RESCUE TO SEEK ASSISTANCE FROM A MANU-O-KŪ EXPERT. The manu-o-Kū expert will assist in the following process:

1. Determine **precisely** where fallen chick came from and, if it is possible to reach the original branch (using a bucket truck or other approach),
2. Place the chick in a small box or in a small ventilated bag to hoist it up to the breeding site,
3. Gently place the chick back onto its original branch.

It’s very important to put the chick back on the *original* branch from which it came if at all possible. A chick that is returned to a branch it did not come from is faced with a high risk of dying. Its parents will likely fail to recognize or find it, or may even confuse it with an unknown chick and attack it. If it is returned to its breeding site, it will be important that someone wait and verify that a parent has returned and found the chick. If you are uncertain about where the chick fell from, you will likely be instructed to turn the chick in to a rescue organization.

Also see the appendix for guidelines on what to do in case you must rescue and temporarily care for an abandoned (or fallen) chick.

In summary, report problems, don’t hide them. It’s preferable to have experts assist with complex situations that may have a better outcome as a result of the trained professional having placed a phone call.

Accidental Taking

If these guidelines are followed, accidental taking should not occur. However, if a tree professional realizes after-the-fact that they caused the death or injury of a manu-o-Kū, displacement of a manu-o-Kū chick or destruction of a manu-o-Kū egg, then immediately cease activity and report the incident to the U.S. Fish and Wildlife Service, Office of Law Enforcement at (808) 861-8525. A compliance interview will ensue, possibly over the phone, or an in-person interview may be requested to fully understand the situation and the circumstances and to recommend remedial actions. Voluntary reporting of unauthorized takings (injury or killing) is favorably considered by both State and Federal Conservation/Wildlife Officers.

Because manu-o-Kū are well-liked and attract attention from the community, members of the public also may report an accidental taking. In light of this, self-reporting will work in favor of the tree professional.

Enforcement Penalties

Both State and Federal Officers strive to protect manu-o-Kū first by outreach and education. However, fines or even incarceration could ensue for negligent or egregious conduct. First infractions may serve to warn the person or company harming a chick, egg or adult. Fines may be smaller for first infractions, for example in the range of several hundred dollars, but will escalate if there is a finding of intentional, egregious harm or repeated negligence.

USEFUL CONTACTS

Who to contact with general questions about manu-o-Kū

- US Fish and Wildlife Service, Migratory Birds Office - Jenny Hoskins at (808) 281-9129, jenny_hoskins@fws.gov; or Keith Swindle and Jennifer Roth (808) 861-8525.
- Hawai'i DLNR Division of Forestry and Wildlife, (808) 973-9778 (O'ahu), M-F 8:00 a.m. to 4:30 p.m.

Where to take chicks that cannot be re-united with their parents

Call the Hui Manu-o-Kū hotline, (808) 379-7555, or the Hawai'i Wildlife Center during business hours at (808) 884-5000, or (415) 503-8098 after hours. HWC is open 7 days a week for wildlife rescue assistance. In the unlikely event that you don't reach someone through the Hui Manu-o-Kū hotline, HWC will put you in touch with a local veterinary partner where the chick can be taken.

What can be done if someone is cutting down a tree with indigenous birds or wildlife in it?

If you believe you are witness to a violation or have information about a violation and wish to report it, call (808) 643-DLNR (643-3567) to reach DOCARE, DLNR's Division of Conservation and Resource Enforcement.

APPENDIX

**WHITE TERN (MANU O KŪ)
GROWTH CHART**

Hui Manu O Kū
Rich Downs, Coordinator
(808) 379-7555
huimanuoku@gmail.com



Hui Manu O Kū

Newly Hatched



1 Week



2 Weeks



3 weeks



4 Weeks



5 Weeks



6 Weeks



7 Weeks



8 Weeks



Manu-o-Kū in Hawai‘i’s Culture

The following are just a few of the ways manu-o-Kū enrich our lives.

From Ed “Makahipo” Cashman, Director, Ka Papa Lo‘i ‘O Kānewai Hawai‘inuiakea School of Hawaiian Knowledge:

In some Pacific Island mo‘olelo we see the Manu-o Ku, or Kakaia, as a close friend to Kanaloa, who is Maui’s grandfather. Maui goes to Kanaloa to learn the secret of making fire. The Kakaia holds the stick in place for Kanaloa to rub and make fire. Maui takes the stick and burns the eyes of the Kakaia; this is why the Kakaia or Manu-o Ku has black around its eyes. The Kakaia flies away and Kanaloa is disappointed with Maui. Maui then reminds Kanaloa, you know the Kakaia will return. This story shows how the Kakaia gets its black around its eyes, and shows its loyalty to the stick or branch used to make fire and will always return.

From Darienne Dey, Ph.D. Candidate, Department of Education, University of Hawai‘i at Mānoa:

The name “manu-o-Kū” can be translated into English as “bird of Kū” or “Kū’s bird.” Possible explanations for its name include a reference to the bird’s relationship with the Hawaiian deity Kū or descriptions of its behavior based on other meanings of *kū*. Instead of building nests, manu-o-Kū lay single eggs atop places along or at the intersection of branches, where natural *pedestals* (*kū*) form. At various times of day, manu-o-Kū leave their trees to forage at sea and usually return by sunset. After spending many days and nights relying on stars, swells, winds, and other natural clues to navigate canoes across vast expanses of ocean, Hawaiian and other Pacific wayfinders (in olden and modern times) rely on the presence of birds like manu-o-Kū at sea to *reveal* (*kū*) their canoe’s proximity to unseen land. Though wayfinders begin to look for these birds at first light (and until the darkness of night impedes visibility), they take special note of whether the manu-o-Kū is carrying fish in its beak: if its beak is empty, then it could be heading out away from land to fish, but if it has fish, then it is likely heading back towards land (and should be followed). Some fishermen also use manu-o-Kū to additionally reveal where *running schools* (*kū*) of predatory fish are located offshore, observing how the bird suddenly *halts* (*kū*) its flight, dives, and lightly *strikes* (*kū*) the surface of the water in order to collect small fish being driven upwards by larger fish.

Using the Breeding Map on a Mobile Device

- Download the app/KML file onto your smartphone or tablet.
 - Go to www.whiteterns.org, click on the Nest Maps link and select the Complete Manu-o-Kū Breeding Range Map. Click on the Download File link at the bottom of the page and either download the file to your device or email it to yourself.
 - Open the email you sent yourself on your mobile device and tap on the KML file attachment to open it.
 - When prompted to pick how you want to open the file, select Google Earth.
 - Note that you must have Google Earth installed on your mobile device for the KML file to work.*
 - Currently, the KML file doesn't automatically update; an updated file should be retrieved every two to four weeks. When preparing for a big job, contact the Hui to request a custom updated KML file.
- Zoom in to the area where you'll be working and note trees known to have been used for breeding.
 - Touch pins on the map (for example, "IP01" in the screenshot, Figure 1) for information about the tree, the status of each known breeding spot in the tree and photos showing the location of each breeding spot.

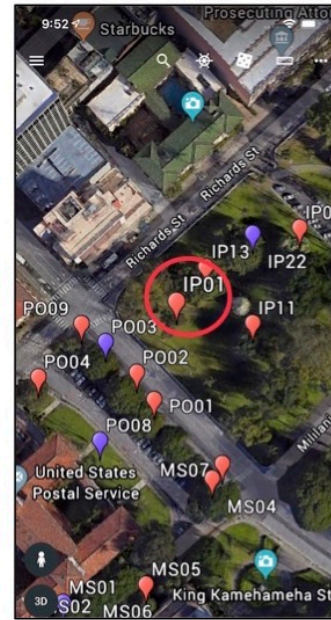
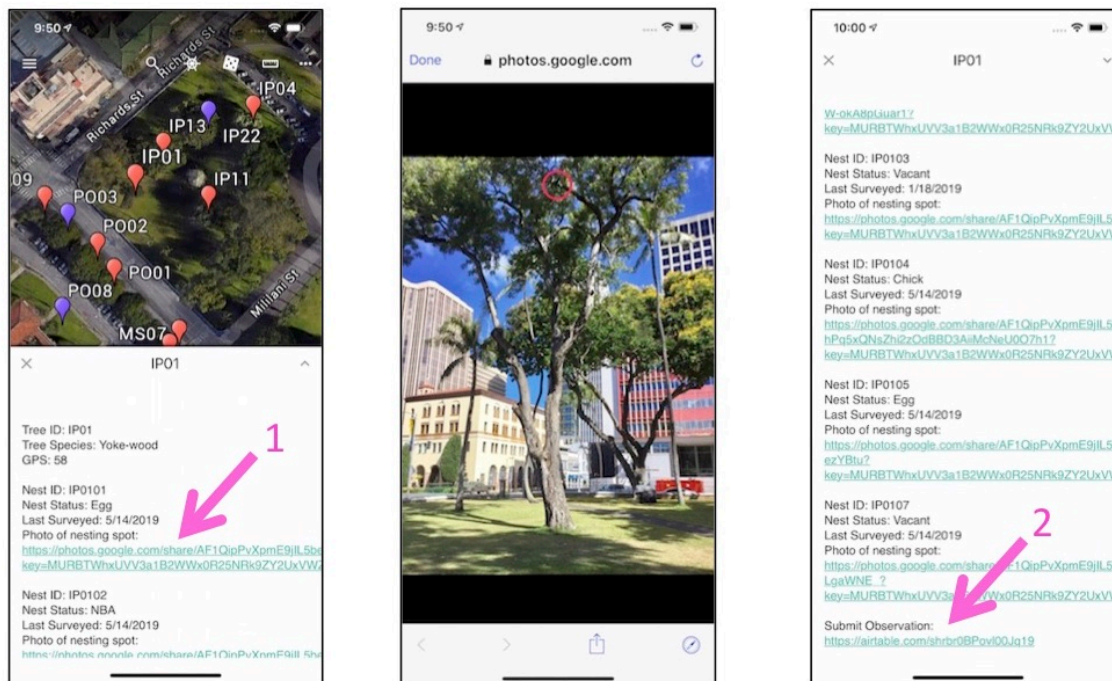


FIGURE 1.



- Tap on the "Photo of nesting spot" link (Arrow #1) to see the location of the breeding spot. Scroll down on the display to see other breeding spots in this tree.
- The red circle shows the location of breeding spot IP0102 (center screenshot).
- You also can add new information about the breeding sites. Scroll down and tap the "Submit Observation" link to update information on the breeding spot (Arrow #2).

For questions, contact Hui Manu-o-Kū at (808) 379-7555

Rescue and Temporary Care of Abandoned or Fallen Chicks

If you do not know which tree or branch within a tree a fallen chick came from, or if efforts to reunite a chick with its parents are not possible, and you're unable to reach the Hui_Manu-o-Kū at (808) 379-7555, then continue with the steps below adapted with permission from the Hawai'i Wildlife Center.

Please note that HWC only accepts native species. For assistance identifying the bird, call (808) 884-5000 during business hours. You may also email a photo of the bird to HWC at birdhelp@hawaiiwildlifecenter.org.

For your safety and the safety of the bird, the HWC should be contacted at (808) 884-5000 during office hours for instructions. For off-hours, we have provided the steps below.

1. Find and prepare an appropriate-sized container.

- Use a cardboard box, plastic tub or dog/cat carrier large enough for the bird to comfortably sit or stand in. Make sure the container is well ventilated.
- Place a clean, soft cloth with no strings, loops or holes on the bottom. A T-shirt is a good example.
- For small birds, you can use a paper bag with small ventilation holes and with a paper towel on the bottom.

2. Use caution and protect yourself.

- Approaching the bird from behind, cover the bird with a lightweight towel, t-shirt, or small sheet, carefully wrapping the material completely around its back and wings.
- A bird with a long neck and beak should be handled very carefully as they may attempt to strike out and stab. In this case, safety glasses should be worn, or call Hawai'i Wildlife Center for advice (note that this is not a concern with manu-o-Kū as long as you do not put the bird within several inches of your eyes).

3. Gently pick up the covered bird and place it in the prepared container.

4. Do not give food or water to the bird and do not leave any in the container or bag.

5. Secure the lid of the box, or roll the top of the paper bag closed and secure with a paper clip or tape.

6. Place the container/bag in a quiet and dark place, away from people, animals and loud noises.

7. Wash your hands if you handled the bird without gloves.

8. Contact and deliver the bird to one of the organizations below as soon as possible. See below for a list of resources. Trained volunteers and professionals with these groups will be better equipped to examine and stabilize the rescued bird. If you're unable to reach someone immediately, keep the bird in the container in a dark, quiet, and warm area until the next morning.

Do not attempt to release the bird yourself. It may have internal injuries or be too tired or weak to survive. Throwing the bird into the air could cause more injury. Let the trained wildlife response staff examine the bird and decide when, where and how to let it go.

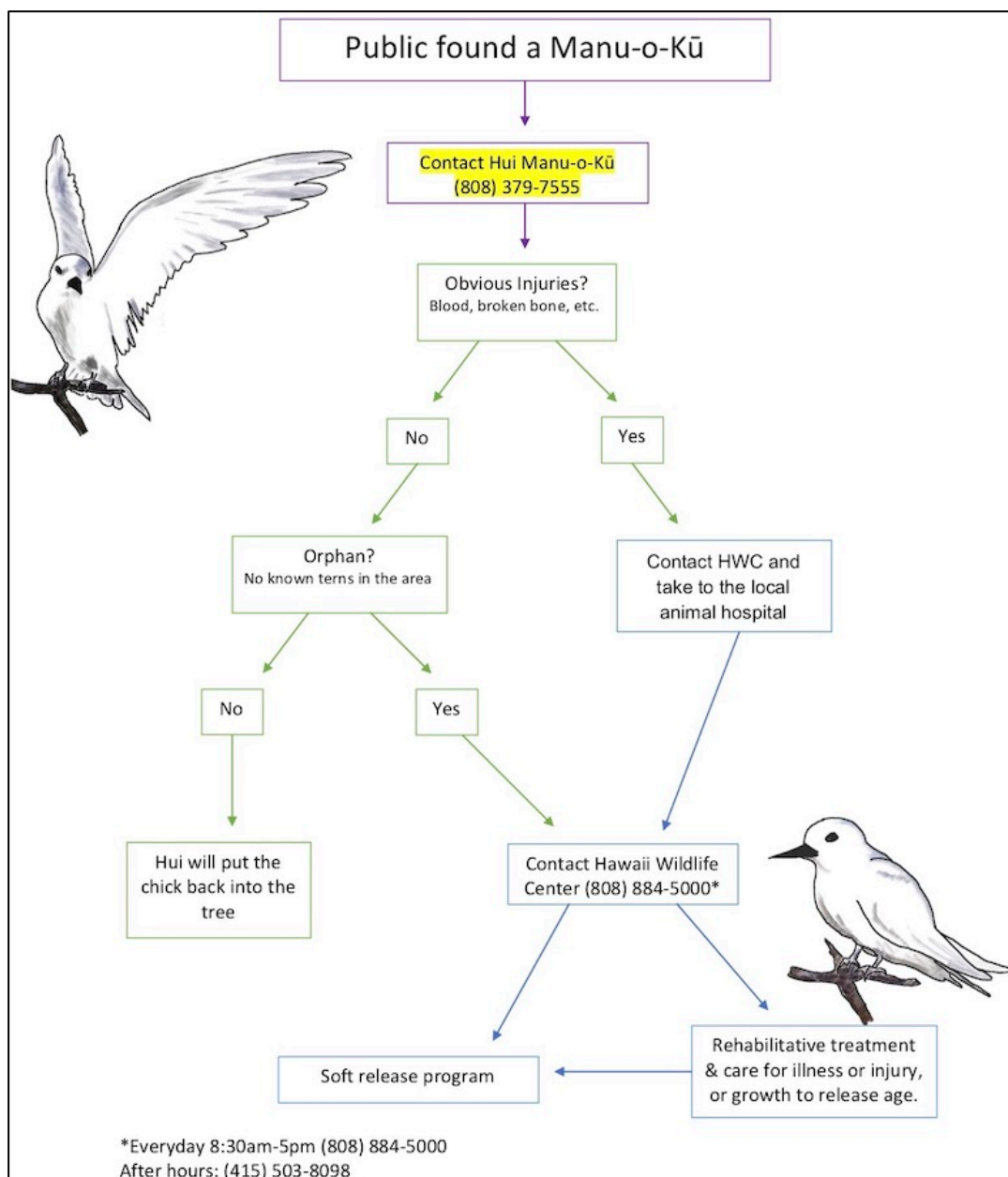
(Continued next page)

(Rescue and Temporary Care of Abandoned or Fallen Chicks, Continued)

Be sure and write down the information about where you found the bird. The best information would be a street address or street intersection, the number of a nearby utility pole or highway mile marker. Provide as much detail as possible. Also include your telephone number so staff can call you to get additional information about the bird you found if necessary.

In Hawai'i as in most states, it is against the law to keep any wildlife without appropriate rehabilitation permits, even if you plan on releasing them. More information about the Hawai'i Wildlife Center can be found at <http://www.hawaiiwildlifecenter.org/>

MANU-O-KŪ RESCUE FLOW CHART



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